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WITNESS my hand this
Fifth day of May 2005

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Improved facing for soil reinforced retaining wall

The present invention relates to an improved method of applying the facing to a soil reinforced retaining wall.

Traditional soil reinforced retaining walls consist of a reinforcement within the soil and a concrete slab, sheet steel or rock filled wire basket to act as the facing. The facing on a soil reinforced retaining wall is the structure that forms the front of the wall, usually vertical or inclined. The facing prevents the soil from escaping from between the layers of reinforcement.

Soil reinforcement has proven to be a very low cost and reliable method of retaining soil. The largest cost component of the system is usually the facing panels. These panels are usually constructed from formed concrete with brackets protruding from the back to permit connection of the soil reinforcement. Other methods consist of concrete blocks with plastic pins between the blocks and the pins are used to restrain plastic sheets of soil reinforcement. The incorporation of the connection method adds expense to the product and is commonly a source of corrosion.

The soil reinforcement must be added to every layer of blocks and some form of propping is required to prevent the facing components from moving whilst the soil is compacted around the reinforcement. The blocks are very heavy to restrain them in position during compaction, but they usually move slightly, pushing the wall out of alignment. The added mass increases the component and the installation cost.

The present invention was developed to overcome at least some of the abovementioned problems and to combine the cost advantages of lightweight construction and no connection requirement for soil reinforcement.

Throughout this specification the term 'comprising' is used inclusively, in the sense that there may be other features and/or steps included in the invention not expressly defined or comprehended in the features or steps subsequently defined or described. What such other features and/or steps may include will be apparent from the specification read as a whole.

According to the first aspect of the present invention there is provided a method of constructing a soil reinforced retaining wall comprising

soil reinforcement comprising a strip positioned approximately parallel to the horizontal adjacent faces of a hollow block said strip being bent into a shape that permits it to pass continuously though from one side to the other of a hollow block

said hollow blocks with inserted reinforcement strip or strips being placed onto the earth or other blocks in a horizontal row and the cavity or cavities of the blocks filled with soil and one or more concrete shear pin or pins

the volume behind the row of blocks is filled with soil and compacted in the usual soil reinforcement art

and the next layer of blocks is placed on top of the previous layer in a manner encapsulating the concrete shear pin protruding from the lower layer and filled with soil and concrete shear pins

followed by soil backfill in the usual retaining wall art

said procedure being repeated until the required height has been achieved.

According to the second aspect of the present invention there is provided a method of constructing a soil reinforced retaining wall comprising

soil reinforcement comprising a strip positioned approximately parallel to the horizontal adjacent faces of a hollow block said strip being bent into a shape that permits it to pass continuously though from one side to the other of a hollow block

said hollow blocks with inserted reinforcement strip being placed onto the earth or other blocks in a horizontal row and the cavity or cavities of the blocks filled with soil and one or more concrete shear

the volume behind the row of blocks is filled with soil and compacted in the usual soil reinforcement art

and the next layer of blocks is placed on top of the previous layer said procedure being repeated until the required height has been achieved.

According to the third aspect of the present invention there is provided a method of constructing a soil reinforced retaining wall comprising

soil reinforcement comprising a strip positioned approximately parallel to the horizontal adjacent faces of a hollow block said strip being bent into a shape that permits it to enter one side of the hollow block and enter the cavity of the block without passing through the adjacent side of a hollow block

said hollow blocks with inserted reinforcement strip or strips being placed onto the earth or other blocks in a horizontal row and the cavity or cavities of the blocks filled with soil and one or more concrete shear pin or pins

the volume behind the row of blocks is filled with soil and compacted in the usual soil reinforcement art

and the next layer of blocks is placed on top of the previous layer in a manner encapsulating the concrete shear pin protruding from the lower layer and said procedure being repeated until the required height has been achieved.

According to the fourth aspect of the present invention there is provided a method of constructing a soil reinforced retaining wall comprising

soil reinforcement comprising a strip positioned approximately parallel to the horizontal adjacent faces of a hollow block said strip being bent into a shape that permits it to enter one side of the hollow block and enter the cavity of the block without passing through the adjacent side of a hollow block

said hollow block comprises a plurality of cavities and a portion of its shape that enters the adjacent block above it

said hollow block containing reinforcement strip or strips being placed onto the earth or other blocks in a horizontal row and the cavity or cavities of the blocks filled with soil and one or more concrete shear pin or pins

the volume behind the row of blocks is filled with soil and compacted in the usual soil reinforcement art

and the next layer of blocks is placed on top of the previous layer in a manner encapsulating the concrete shear pin protruding from the lower layer and said procedure being repeated until the required height has been achieved.

Such an invention permits the manufacture of the concrete blocks by hydraulic press resulting in reduced cost. It also results in a lightweight block thereby permitting rapid hand installation. The weight of the blocks is increased by the addition of soil within its cavities increasing its resistance to movement during compaction. As the soil enters the cavity of the block its fills the volume between the hollow block and the shear pin thereby preventing movement during compaction. The strips are not mechanically connected to the blocks thereby reducing the component cost of the block, labour time in connecting and removes the opportunity for incorrect attachment of the reinforcement to the facing block. The lowest cost reinforcement at present is galvanised steel. The provision of holes on galvanised sheet accelerates corrosion. The reinforcement is automatically located by the fill as it enters the cavity of the block. The facing block may be manufactured in a rectangular shape and laid in a standard interlocking brick pattern which increases the ascetics of the wall and also increases its strength.

The present invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is an isometric view of the reinforcement bent into shape, a sectional isometric view of the hollow concrete block and a concrete shear pin.

Figure 2 is an isometric view of the reinforcement, hollow concrete block and shear pins assembled with the blocks laid in a horizontal row.
Figure 3 is an isometric view of the assembled layer of blocks backfilled with soil in the usual reinforced soil art.
Figure 4 is an isometric view of the next layer of blocks laid on top of the previous layer without reinforcement.
Figure 5 is an isometric view of the next layer of blocks laid above the previous layer with soil reinforcement.
Figure 6 is and isometric view of a hollow block and reinforcing strips added to each cavity.

Referring to figure 1 the reinforcement (1) comprises a galvanised steel strip bent into the shape of a U. The dimensions of the U permit the steel strip to fit into the hollow block (2) when filled with sand. The strip is placed into the cavity of the hollow concrete block as seen in the sectional isometric view. The shear pin (3) is a concrete rectangular block and is inserted into the cavity filled with sand.

To construct the wall a strip of reinforcement (1) is first placed into one or both hollow cavities of the block (2) as seen in figure 6. The amount of strips of reinforcement will be determined by the surcharge loading on the retaining wall.

The blocks complete with the inserted strips are placed in the position to form one row of the face of the retaining wall as seen in figure 2. It is usual practise to lay one unbent strip along the front edge of the row of blocks to maintain level. The cavities of the blocks are then filled with sand (4) to stabilize them during backfilling and compaction..

The backfill (5) is added and compacted as seen in figure 3 in the usual art.

The next layer of blocks (2) are placed on top of the previous layer as seen in figure 4. Due to the shear pins top and bottom reinforcement is normally required for every second layer. Reinforcement could be added to all layers in the case of large surcharge loads on the wall. Soil is placed behind this reinforcement free layer if desired or added once the next layer of blocks is in place with its reinforcement.

Numerous variations and modifications will suggest themselves to persons skilled in the relevant art, in addition to those already described, without departing from the basic inventive concepts. For example the orientation of the blocks could be changed to produce a different block pattern, plastic net, steel wire or plastic strip could be used as reinforcement. The block shape could be changed to produce a certain face pattern of the wall. Multiple strips could be placed in each block cavity, multiple cavities could be formed into each block to house the strips. All such variations and modifications are to be considered within the scope of the present invention, the nature of which is to be determined from the foregoing description.

DATED THIS 31ST DAY OF MARCH 2004

Samuel P Costin.

Figure 1

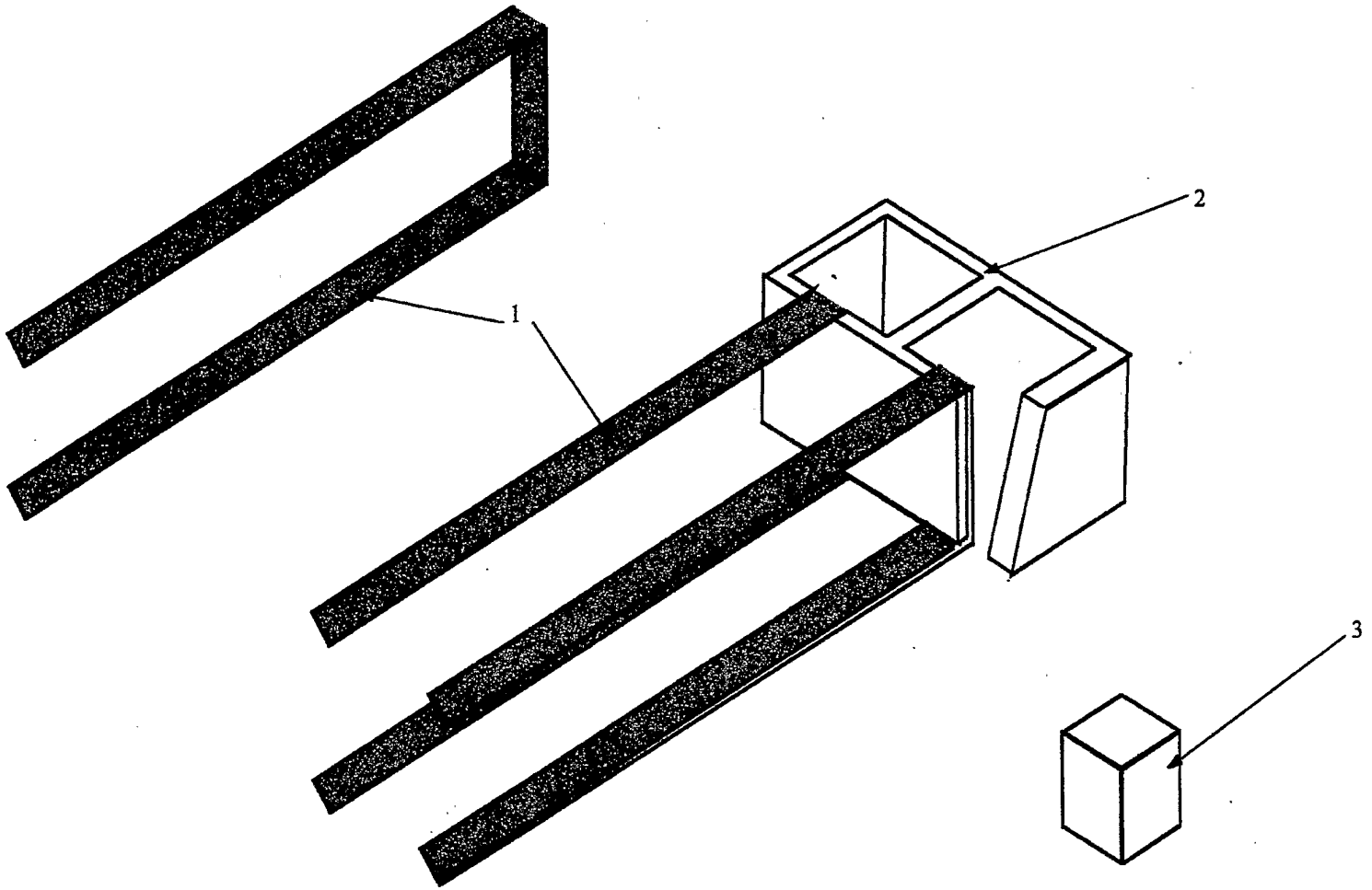

Figure 2

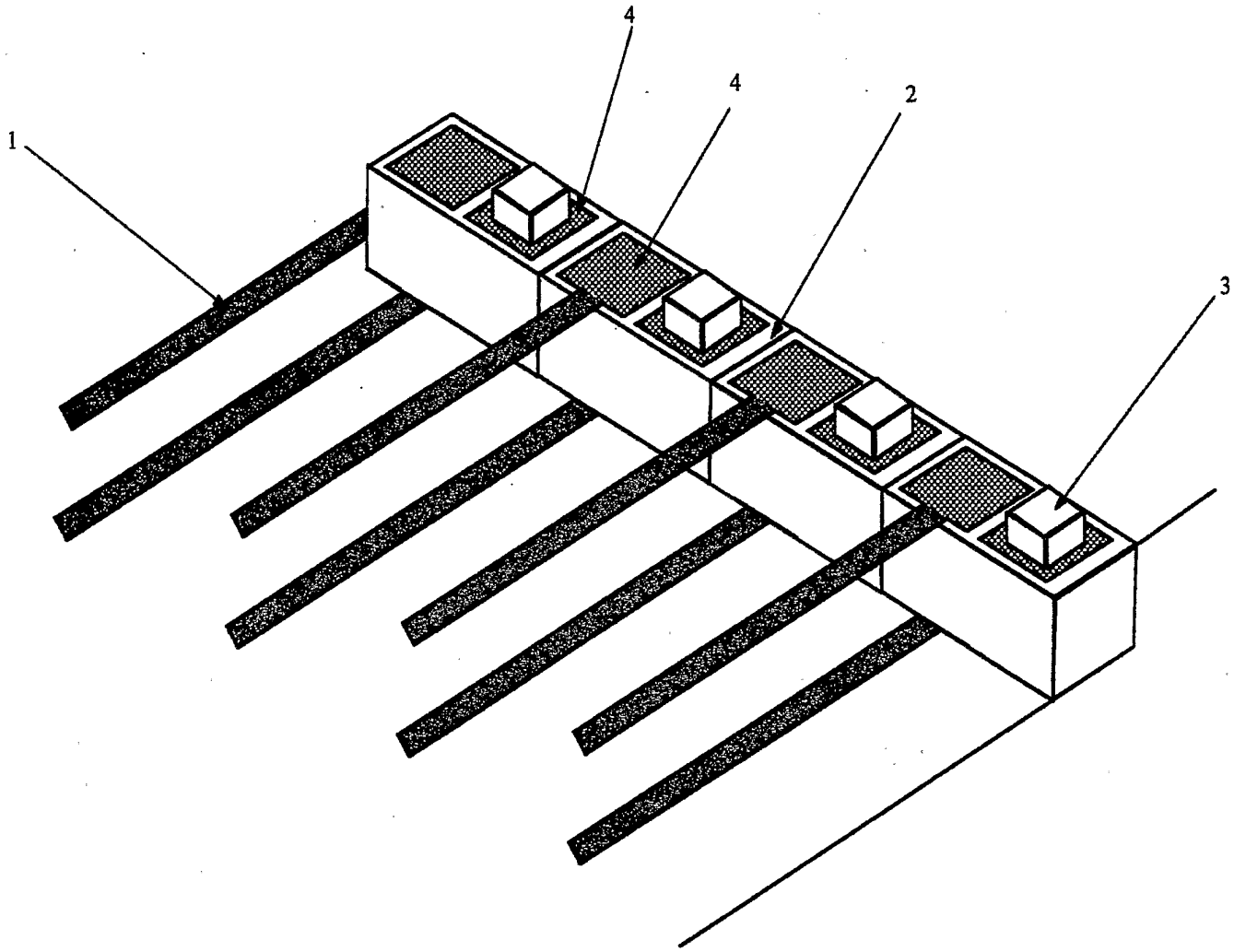

Figure 3

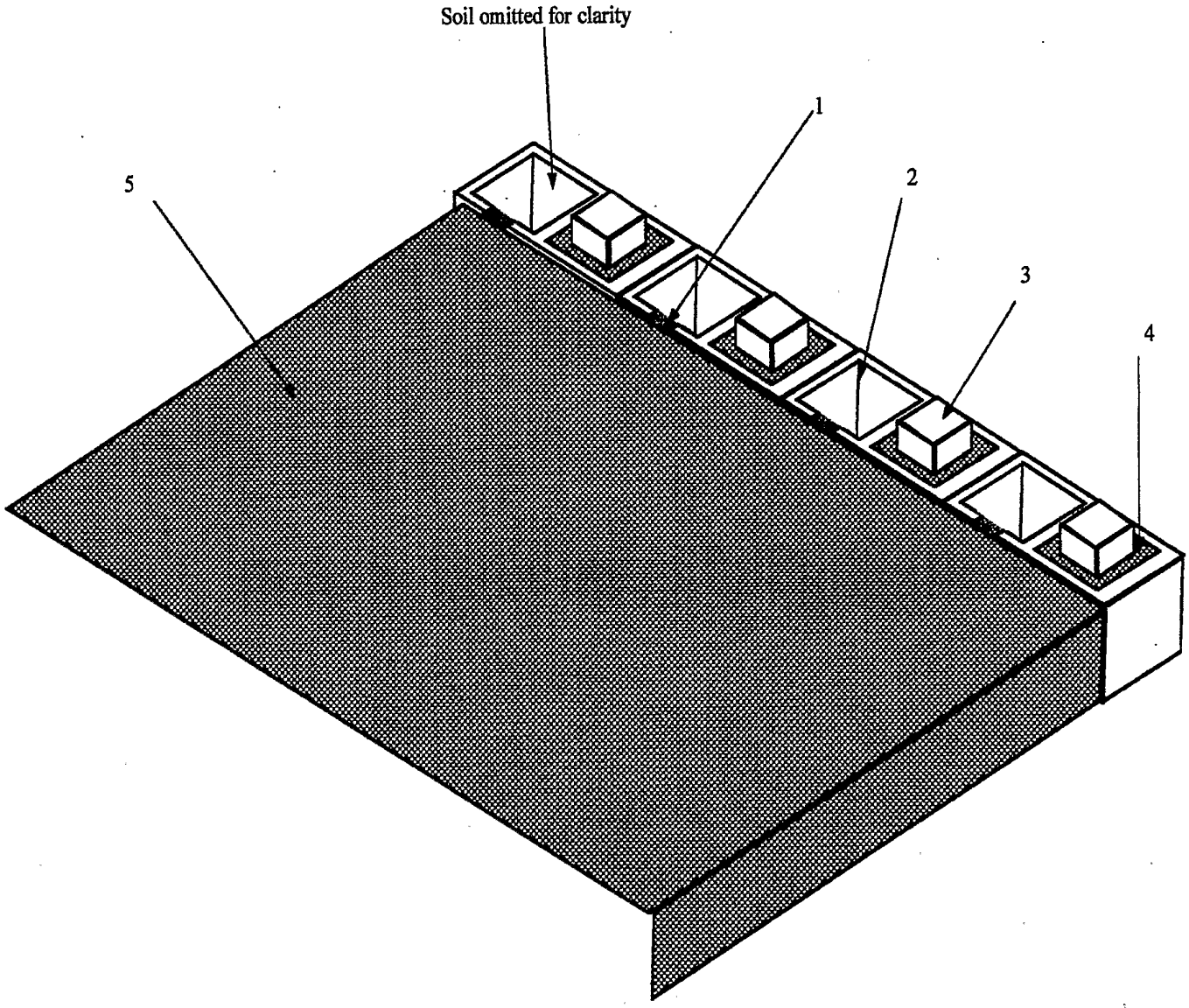

Figure 4

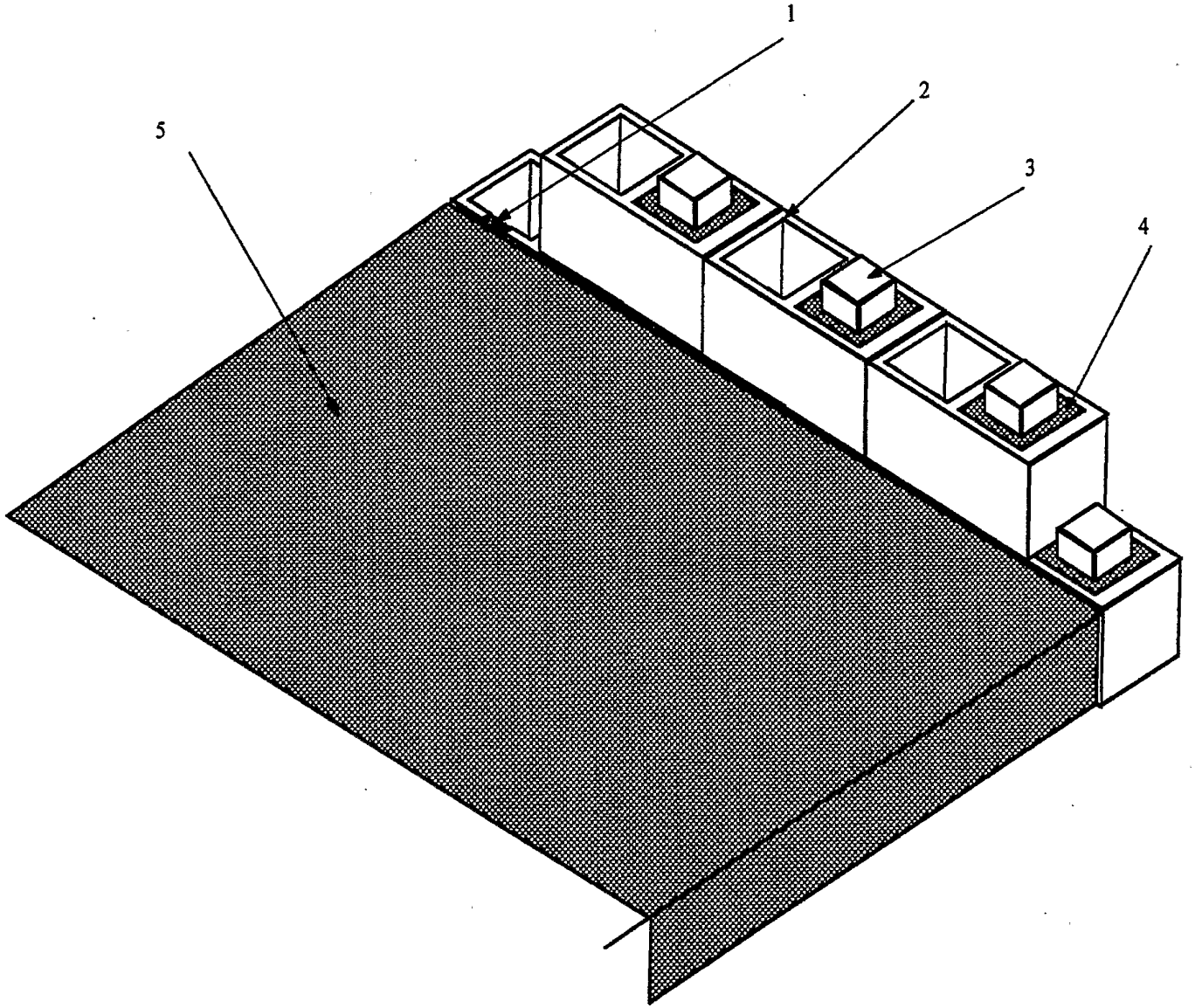

Figure 5

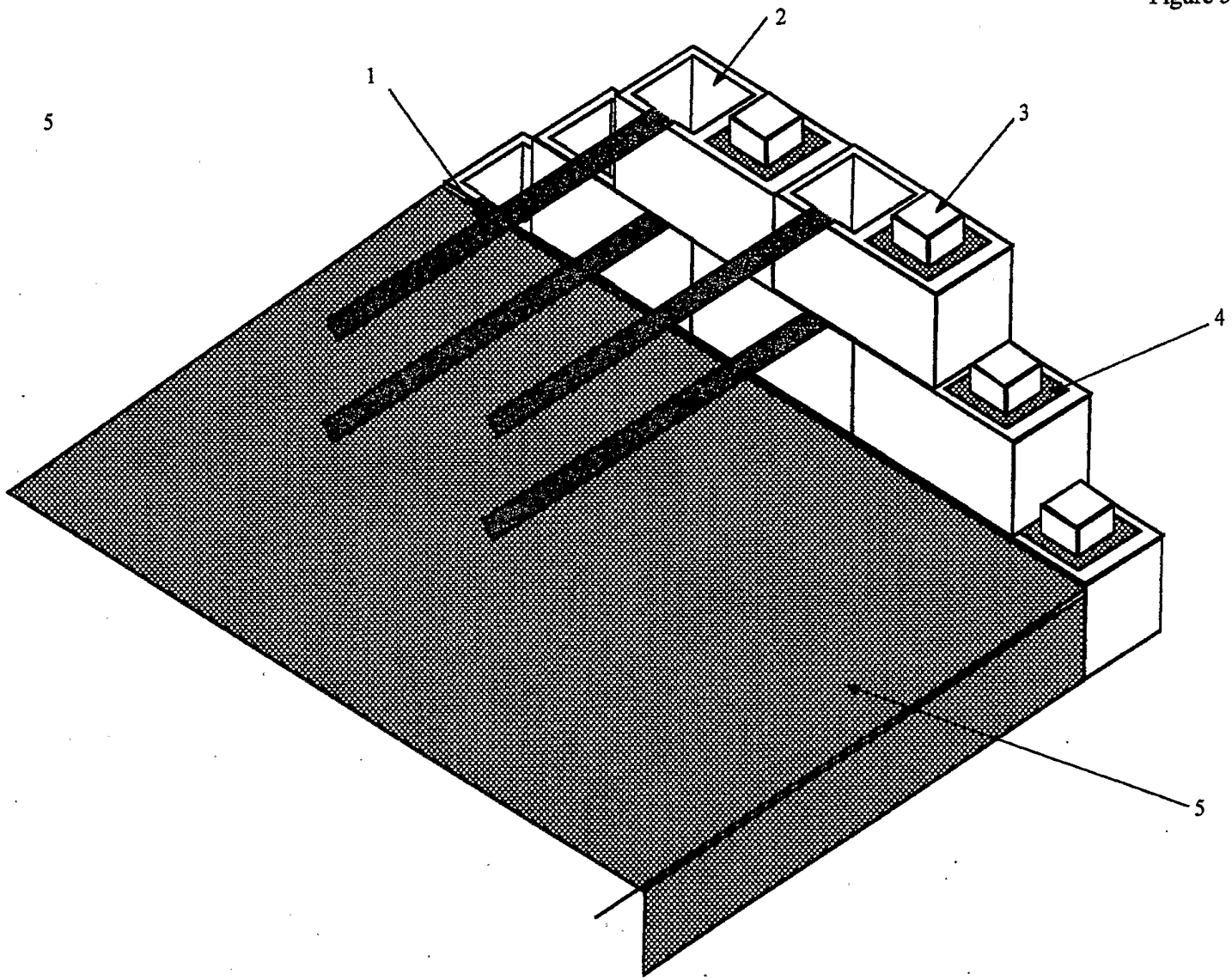

Figure 6